



## RECORDS OF AN UNCOMMON STONEFLY, *NEMOCAPNIA CAROLINA* BANKS (PLECOPTERA: CAPNIIDAE), IN SOUTH CAROLINA AND NEARBY STATES

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### ABSTRACT

New records of *Nemocapnia carolina* Banks are reported for South Carolina including the first specimens known from Oconee Co. since a collection made from Richland in 1931. A few records are also reported for this species from Alabama, North Carolina, Virginia and from the South Carolina-Georgia border.

**Keywords:** Plecoptera, Capniidae, *Nemocapnia carolina*, South Carolina, distribution

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### INTRODUCTION

*Nemocapnia carolina* Banks 1938, originally described from "Morgantown, N. Car." (Banks 1938; Frison 1942), is known from scattered sites extending from Quebec and Illinois (Frison 1942; Harper & Hynes 1971) to Florida (Ray et al. 2012; Stark & Gaufin 1979) and Arkansas (Frison 1942; Poulton & Stewart 1991). The earliest South Carolina record of *N. carolina* was reported by Patrick et al. (1966) based on specimens collected at the Savannah River Plant. McCaskill & Prins (1968) reported a second collection of the species made in March 1931 at Richland in Oconee Co. and identified by T.H. Frison in 1944.

Kondratieff & Kirchner (1984) also reported the species from "...Upper Three Runs Creek and its tributaries, such as Tinker Creek". No subsequent reports of the species from the state are known, however a few additional collections have been made by the authors and colleagues from Alabama, North Carolina, South Carolina, and Virginia. Because the species is so rarely collected, and appears to be extirpated from other parts of its range (DeWalt et al. 2005), we take this opportunity to report these records. A complete list of the new collections is given below, and all previously known and new county records are shown on Fig. 1.

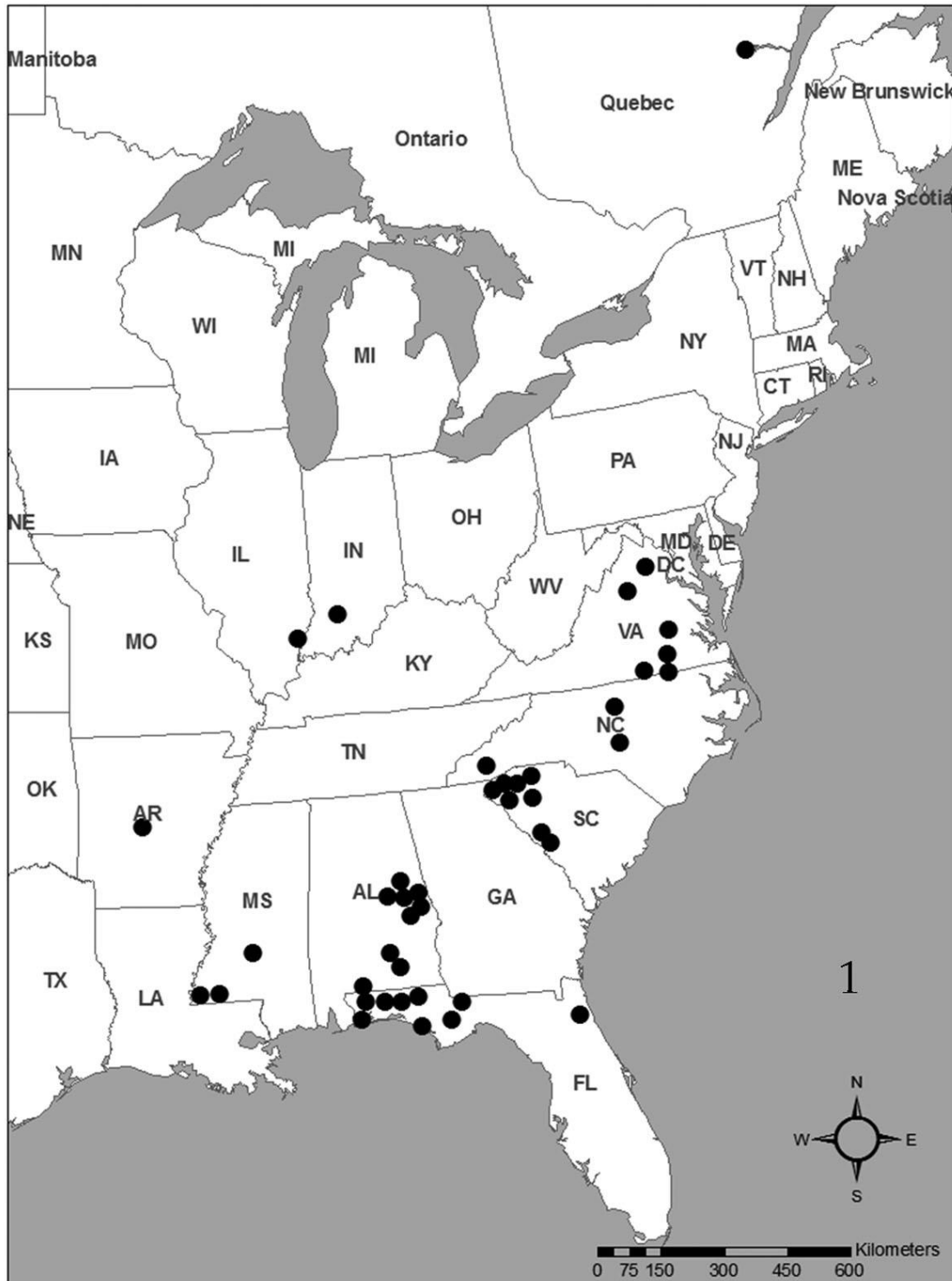


Fig. 1. Distribution of *Nemocapnia carolina*. Each dot represents a single county in which the species has been recorded.

## MATERIALS AND METHODS

Adult specimens were collected with beating sheets and by hand collecting from bridge railings and logs; larval specimens were collected in kick net samples and by hand picking specimens from rocks and debris. Specimens were placed in 75-80% ethanol and archived in the Audrey B. Harrison collection (ABHC), Jackson, Mississippi, the Bill P. Stark collection (BPSC), Mississippi College, Clinton, Mississippi, the C.P. Gillette Museum (CSUC), Colorado State University, Fort Collins, Colorado, the Clemson University Arthropod Collection, Clemson, South Carolina (CUAC), the Illinois Natural History Survey, University of Illinois, Champaign, Illinois (INHS), and the Scott A. Grubbs Collection, Western Kentucky University, Bowling Green, Kentucky (WKUC).

## RESULTS

### *Nemocapnia carolina* Banks

*Nemocapnia carolina* Banks 1938: 74. Type series (Museum of Comparative Zoology), Morgantown, [Alamance Co.] North Carolina

*Nemocapnia carolina*: Frison, 1942:262. Redescription

*Nemocapnia carolina*: Nations et al., 2007:92. SEM of adult genitalia

**Known distribution** (DeWalt et al. 2016; Stewart & Stark 2002). AL (James 1972; Stark & Harris (1986), AR (Frison 1942; Poulton & Stewart 1991), FL (Pescador et al. 2000; Ray et al. 2012; Stark & Gaufin 1979), IL (Frison 1942), IN (Frison 1942), MS (Nations et al. 2007; Stark 1979), NC (Banks 1938; Beaty 2016), QC (Harper 1971; Harper & Hynes 1971), SC (Kondratieff & Kirchner 1984; McCaskill & Prins 1968; Patrick et al. 1966), VA (Frison 1942).

**New records:** **ALABAMA:** Clay Co., Enitachopco Creek, CR 35, 9 km ESE Millersville, 33.160017 N, 85.835136 W, 22 February 2009, S.A. Grubbs, 1♀ (WKUC). Same site, 8 April 2010, S.A. Grubbs, 2♀ (WKUC). Coosa Co., Jacks Creek, CR 40, 8 km NE Rockford, 32.917167 N, 86.133850 W, 6 March 2012, S.A. Grubbs, 3♂, 2♀ (WKUC). Tallapoosa Co., Hillabee Creek, 15 km NE Alexander City, 33.065736 N, 85.879833 W, 22 February 2009, S.A.

Grubbs, 10♂, 10♀ (WKUC). Same site, 8 April 2010, S.A. Grubbs, 3♂, 10♀ (WKUC). **NORTH CAROLINA:** Jackson Co., Whitewater River, 35° 02.246' N, 83° 01.258' W, 17 March 2011, K. Gilbert, 1 larva (CUAC). **SOUTH CAROLINA:** Aiken Co., Upper Three Runs Creek, Thermal Effects Lab, Savannah River Plant, 8 January 1984, B.C. Kondratieff, 1♂ (CSUC). Savannah River, above Little Hell's Landing, 19 January 1952, T.D., S.S. Roback, 1♂, 1♀, 3 larvae (BPSC). Anderson Co., Pendelton Swamp, 34.65° N, 82.70° W, 18 January 1995, J. Morse, 1 larva (CUAC). Coffee Creek, 13 January 1999, P. Smith, 1 larva (CUAC). Edgefield Co., Cheves Creek, 33.39° N, 82.01° W, 5 February 2000, D. Carnegiey, B. Robinson, 3 larvae (CUAC). Greenville Co., Rocky Creek, 14 January 2003, J.M. Pike, 2 larvae (CUAC). Laurens Co., Walnut Creek, Hwy 252, 2 mi E Hwy 25, 18 February 1977, P.H. Carlson, 1♂ (BPSC). Oconee Co., Chattooga River, Section 2, Hwy 28, 34° 54.445' N, 83° 10.840' W, 6 March 2016, B. Stark, A.B. Harrison, K.C. Nye, 5♂, 4♀ (BPSC), 9♂, 7♀ (ABHC). Chattooga River, 2 April 2003, J. Morse, 1♂ (CUAC). Chattooga River, 2 April 1977, J.H. Gable, 1♀ (CUAC). Pickens Co., Six Mile Creek, 34.80° N, 82.85° W, 1 February 1998, S.B. Hays, 1 larva (CUAC). Clemson Experimental Forest, Wildcat Creek, 34.7522° N, 82.8475° W, 20 January 2011, O. Yadamsuren, 1 adult (CUAC). Clemson Experimental Forest, 34.25° N, 82.85° W, 20 February, 1997, M. Constantino, 1 larva (CUAC). Spartanburg Co., Lawson Fork Creek, 26 January 2001, J.W. Pike, 1 larva (CUAC). **VIRGINIA:** Brunswick Co., Meherrin River, 10 km SE Lawrenceville at CR 670, 36.71331 N, 77.74988 W, 16 January 2016, R.E. DeWalt, RED-2016-012, preserved in 95% EtOH, 5♂, 5♀ (INHS-Insect Collection-792973). Dinwiddie Co., Nottaway River, 10 km SSE McKenney at Cutbank Rd, 36.90107 N, 77.67311 W, 16 January 2016, R.E. DeWalt, RED-2016-013, preserved in 95% EtOH, (INHS-Insect Collection-792980).

## DISCUSSION

The biology of *N. carolina* is poorly known due to its relative rarity and to a probable hyporheic occurrence of the larvae. Based on associations of adult specimens with large streams such as the

Chattooga River in Oconee Co., South Carolina, and with 2<sup>nd</sup> order streams such as Mill Creek in Simpson Co., Mississippi (Nations et al. 2007), we surmise the species is flexible with regard to flow regime and substrate preference. The known distribution extends from Quebec to Florida and as far west as Arkansas, but many of the reports (e.g. Arkansas, Illinois, Indiana) date back to collections made in the 1930's and 1940's (Frison 1942), and in several states and provinces the species is still known from a single collection. For example, Harper & Hynes (1971) note the only Canadian record is "...from the Quebec North Shore", and Poulton & Stewart (1991) confirmed the Frison (1942) record from Saline Co., Arkansas as the only known collection site of the species from west of the Mississippi River. Ed DeWalt (pers. comm.) suggests that this record may have only been repeated by Poulton & Stewart (1991) since there is no such specimen in the INHS collection. A current digitization project involving the K.W. Stewart Collection and a subset of the B.C. Poulton Collection may yet confirm the existence of the specimen. Only in Florida (at least 15 known sites in 9 counties, Pescador et al. 2000; Ray et al. 2012) and to a lesser degree in Mississippi (8 sites in 3 counties, Nations et al. 2007) has this species been routinely collected in recent years. In South Carolina, most published records have come from the Savannah River and tributaries in Aiken Co., but our recent collection of the species from the Chattooga River in mountainous northwestern South Carolina, and records from the Clemson University Arthropod Museum constitute a significant rediscovery for a species last found in Oconee Co. in 1931 (McCaskill & Prins 1968). Although no sites have been reported from Georgia, the Chattooga River forms the state line with Rabun Co., Georgia and one of the Clemson records is double listed as "Oconee Co, SC/Rabun Co., GA". The record listed from Jackson Co., North Carolina is from the Whitewater River which enters Oconee Co., South Carolina a few kilometers below the collecting site. The Clemson records show a more general distribution of the species within the state and include sites from the Blue Ridge region (Chattooga River sites in Oconee

Co.), the Sandhills region (Savannah River plant sites in Aiken Co.) and the Piedmont region (all additional known sites). DeWalt (unpub. data) collected the southeastern Virginia Coastal Plain during January and February of 2015 and 2016, but found no specimens of *N. carolina*. However, searches of the lower Virginia Piedmont near the North Carolina border turned up several specimens. Currently no specimens have been collected from the South Carolina Coastal Plain region although the species is expected to occur throughout the state.

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